

Stress effects on chemical and magnetic properties of thin film $\text{La}_x\text{Sr}_{1-x}\text{CoO}_3$

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$\text{La}_x\text{Sr}_{1-x}\text{CoO}_3$ (LSCO) has a wide variety of potential applications, including being favored as a cathode material in solid oxide fuel cells. Thin films of LSCO are highly sensitive to stress effects arising from interfaces with other materials. These stress effects can significantly alter the chemical and magnetic properties of LSCO thin films. X-ray absorption spectroscopy (XAS) and x-ray magnetic circular dichroism (XMCD) provide element specific information about a materials chemical and magnetic properties. In our study XAS and XMCD spectra were collected from LSCO thin films with various capping layers grown in a wedge (0-100 Å). Figure 1 shows XMCD intensity vs thickness of NGO capping layer(left), and XAS and XMCD spectra for representative thicknesses (0 Å, 50 Å, and 100 Å) of NGO(right). The decrease in XMCD intensity and changes in XAS shape indicate the formation of an interlayer with significantly altered magnetic properties as NGO thickness increases. Understanding how interfacial stress affects the properties of thin film LSCO will allow its use to better engineer devices.

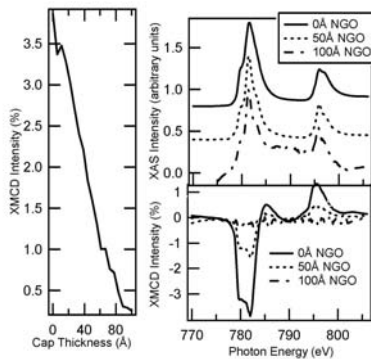


Fig 1 Magnitude of XMCD intensity as a function of capping thickness (left) and XAS and XMCD Spectra for representative thicknesses (right)